Space Weather Forecast

Issued on Wednesday, 01 March 2023 at 12:35 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Recent coronal mass ejection (CME) and fast wind influence gradually easing on March 1st. Likely chance of Moderate flares, with slight chance of Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours, with a single high level Moderate class flare observed at 28/1750 UTC, from a large and magnetically complex sunspot region, located in the northwest quadrant. This region also produced a more recent low level Moderate flare at 01/0107UTC. Other spot regions are relatively small and magnetically simple. An emerging region on the northeast limb could also reveal further complexity as it rotates further into view.

The large moderate-class flare did produce a coronal mass ejection (CME), which was modelled and shows a trajectory well ahead of Earth orbit. There have been no other Earth-directed CMEs observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have been strong during the past 24 hours, largely due to a fast wind from a coronal hole, which was initially masked by the recent CME effects. Total magnetic field strength was initially moderate, but soon decreased to weak levels. The north-south component has varied weakly throughout. Geomagnetic activity was Quiet to Active (Kp 1 to 4).

Energetic Particles / Solar Radiation: The count rate of energetic particles has been has returned to background levels through the last 24 hours.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is forecast through the period, mainly due to the large and magnetically complex sunspot region in the northwest quadrant. An emerging sunspot region in the far northeast may also start to contribute to the flare risk.

Solar Wind / Geomagnetic Activity: Recent CME activity has declined, with solar wind speeds decreasing towards elevated levels. No further CMEs are forecast to affect the Earth. Solar winds are expected to slowly decline towards slightly elevated or background levels during the next couple of days as high speed stream effects wane. Geomagnetic activity is forecast to start mainly Quiet to Unsettled, but with an initial small chance of Active intervals. Mostly Quiet for the remainder of the period, but possibly becoming Quiet to Unsettled, with a slight chance of Active or G1/minor storm interval later on day 4 (04 March) due to the potential arrival of a fast wind from a coronal hole.

Energetic Particles / Solar Radiation: The count rate of energetic protons is expected to fall to background with only a slight chance of further enhancements. These are most likely to be due

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to any flares from the large sunspot in the northwest.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	1	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	65	60	50	50
Very Active	R3 to R5 X	No	20	20	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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